



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/751,443	01/06/2004	Hongmei Wang	M4065.0536/P536-B	2565
24998	7590	03/16/2006		
DICKSTEIN SHAPIRO MORIN & OSHINSKY LLP 2101 L Street, NW Washington, DC 20037			EXAMINER PIZARRO CRESPO, MARCOS D	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 03/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/751,443

Applicant(s)

WANG ET AL.

Examiner

Marcos D. Pizarro-Crespo

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 27 and 32-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 27 and 32-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 January 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Attorney's Docket Number: M4065.0536/P536-B

Filing Date: 1/6/2004

Claimed Priority Dates: 11/26/2002 (Continuation of 10/303,696)
6/5/2002 (Divisional of 10/161,615)

Applicant(s): Wang, et al.

Examiner: Marcos D. Pizarro-Crespo

DETAILED ACTION

This Office action responds to the amendment and declaration filed on 12/12/2005.

Acknowledgment

1. The amendment and declaration filed on 5/19/2005, responding to the Office action mailed on 6/10/2005, has been entered. The present Office action is made with all the suggested amendments being fully considered. Accordingly, pending in this Office action are claims 27 and 32-35.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description (see, e.g., par.0041/II.6) with respect to figure 19: **100**.

3. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement-drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet,

and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

6. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 27, 32, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yu (US 6484065) in view of Houston (US 6424016) and King (US 6754104).

8. Regarding claim 27, Yu (see, e.g., fig. 1) shows most aspects of the instant invention including a processor-based system **100** comprising

- A processor **110**
- An integrated circuit **120** coupled to the processor **110**

wherein the circuit comprises a transistor, the transistor comprising source/drain regions of a first conductivity type and a gate stack including a conductive layer.

Although not explicit, Yu shows the circuit including DRAM banks **120a-d**, which by definition are made of transistors, each with its respective first-conductivity-type source/drain regions and conductive-layer gate stack.

Yu, however, fails to specify that the source/drain regions and the gate stack be provided on an SOI substrate and that the conductive layer of the gate stack is of a second conductivity type.

Houston (see, e.g., col.1/ll.14-25), on the other hand, teaches that SOI substrates are good for DRAMs for several reasons. One reason is that SOIs have lower collection volumes.

Like Yu, Houston (see, e.g., figs. 5-6 and col.4/ll.54-58) also shows DRAMs including transistors having source/drain regions of a first conductivity type (n-type) and a gate stack **40** including a conductive layer of a second conductivity type (p-type).

These are fully depleted SOI NMOS **40 41** forming part of a memory array (see, e.g., col.5/ll.52-53).

Houston also shows a partially depleted SOI NMOS transistor **42** comprising source/drain regions provided on the substrate. The source/drain regions are of n-type conductivity (see, e.g., col.5/ll.54-56 and col.6/ll.7-9). A second gate stack is fabricated on the substrate including a conductive layer of a p-type conductivity (see, e.g., col.5/ll.50-51).

It would have been obvious at the time of the invention to one of ordinary skill in the art to have Yu's integrated circuit comprising fully-depleted and partially-depleted transistors having gate stacks and source/drain regions provided on an SOI substrate, wherein the gate stacks are p-type and the source/drain regions are n-type, as suggested by Houston, to lower the collection volume of the integrated circuit.

Yu/Houston teach using polysilicon as the gate material (see, e.g., Houston/col.5/ll.50-60) but fail to teach using silicon/germanium. King, on the other hand, teaches (see, e.g., col.15/ll.20-30) that polysilicon and silicon/germanium are equivalents for their use as gate materials.

Therefore, because polysilicon and silicon/germanium were recognized in the art at the time of the invention as equivalents for their use as gate materials, one of ordinary skill in the art would have found it obvious to substitute Yu/Houston's doped polysilicon for the silicon/germanium that King suggested.

9. Regarding claim 32, Houston shows that the conductive layer of the gate stack is a doped polysilicon layer (see, e.g., col.5/ll.50).

10. Regarding claim 33, King teaches that the conductive layer is silicon/germanium (see, e.g., col/15/ll.20-30).

11. Claims 34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yu/Houston/King in view of Wu (US 6060749).

12. Regarding claims 34 and 35, Yu/Houston/King show most aspects of the instant invention (see, e.g., paragraph 8 above), except for at least one of the gate stacks further comprising a silicide layer or a cap layer over the conductive layer.

Wu (see, e.g., col.5/ll.9-18), on the other hand, teaches that having a silicide cap layer over Yu/Houston/King's gate will reduce the parasitic resistance of the gate.

It would have been obvious at the time of the invention to one of ordinary skill in the art to form a silicide cap layer over Yu/Houston/King's conductive layer, as suggested by Wu, to reduce the parasitic resistance of the gate.

Response to Declaration

13. The declaration filed on 12/12/2005 under 37 CFR 1.131 is sufficient to overcome the Krivokapic reference (US 6452229).

Response to Arguments

14. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

15. Papers related to this application may be submitted directly to Art Unit 2814 by facsimile transmission. Papers should be faxed to Art Unit 2814 via the Art Unit 2814 Fax Center. The faxing of such papers must conform to the notice published in the

Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2814 Fax Center number is **(571) 273-8300**. The Art Unit 2814 Fax Center is to be used only for papers related to Art Unit 2814 applications.

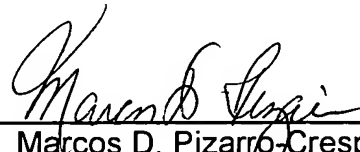
16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Marcos D. Pizarro-Crespo** at **(571) 272-1716** and between the hours of 9:30 AM to 8:00 PM (Eastern Standard Time) Monday through Thursday or by e-mail via Marcos.Pizarro@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on (571) 272-1705.

17. Any inquiry of a general nature or relating to the status of this application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Art Unit: 2814

18. The following list is the Examiner's field of search for the present Office Action:

Field of Search	Date
U.S. Class / Subclass(es): 257/347-354,407	1/23/2006
Other Documentation: PLUS Analysis	3/15/2005
Electronic Database(s): EAST (USPAT, EPO, JPO)	1/23/2006



Marcos D. Pizarro-Crespo
Patent Examiner
Art Unit 2814
571-272-1716
marcos.pizarro@uspto.gov

MDP/mdp
February 28, 2006